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ABSTRACT

The term "class size" refers to the number of students who regularly appear in a teacher's classroom and for whom that teacher is primarily responsible and accountable. "Pupil-teacher ratio" (PTR), in contrast, is an estimate commonly computed by dividing the number of students at a site by the number of professionals who serve or work there. These professionals might include special teachers, counselors, media personnel, or other categories of school workers. Research has established that small class size influences educational outcomes favorably, and that PTR has little influence on outcomes. Further research is needed to explain why this should be so. However, when questions about PTR are removed from the analysis, it is evident that teachers in small classes are responsible and accountable for the learning outcomes of students in their classes. (Contains 1 table and 14 references.) (SLD)

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PUPIL-TEACHER RATIO (PTR) AND CLASS SIZE: WHAT IS THE DIFFERENCE?

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Pupil-Teacher Ratio (PTR) and Class Size: What is the Difference? *

Introduction

Learning and education are life-long experiences. Although people learn on their own throughout their entire lives, a society supports the institution of Education to formalize the transmission of important knowledge and the preparation of youngsters for later life in that society. Education complements and extends learning experiences provided by other groups and institutions such as the economic sector or religion that benefit when the young of a society grow up to perpetuate and advance that society.

Formal education of children in America starts early in life, perhaps with some pre-kindergarten (Pre-K) experiences such as Head Start, but more commonly the education journey starts with Kindergarten (K) followed by 12 years in a graded school. Adults are advocates for young students who don't yet have the skills to make key education choices for themselves. Indeed, building desired decision-making skills and initiating life-long learning are important purposes of the education system, especially of the early and formative years of education.

Using small classes for little children is not a new idea. What is new is that small-class education is now well researched. Using small groups meets the dual tests of common sense and of widespread use elsewhere, not only in education. Small classes, or their equivalent, are already accepted and commonly employed by adults in their workplaces and in social groups. Yet, small classes may meet adult resistance when they are considered for very young children. This is, indeed, one strange conundrum that educators face.

Using small classes for little children is not a new idea. What is new is that small-class education is now well researched and the research supports common sense.

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Class Size: What It Is, And What It Isn't. A Working Definition

The term class size refers to the number of youngsters who regularly appear in a teacher's classroom and for whom that teacher is primarily responsible and accountable. These are the youngsters you would count if you observed a teacher's classroom day in and day out; these are the youngsters on the teacher's class roster.

Except in rare cases, class size is not the same as the pupil-teacher ratio (PTR). The PTR is a derived estimate commonly computed by dividing the number of youngsters at a site, such as at a building, by the number of professionals who work at or serve that site. The professionals might include special teachers, administrators, coordinators, counselors, media persons, and so forth. Sometimes a student-to-adult ratio is used as the PTR, and that may include non-certificated but important support staff such as teacher aides, custodians, food-service and transportation personnel, and maybe even volunteers to make the site's PTR attractive (say 10:1). A small PTR is a badge of honor among schools and a point that they advertise to attract more students. Expensive private schools advertise small classes.

This material is about class size, not about PTR. This is not a semantic game or a trivial distinction. The difference in the United States between PTR and class size is often more than 10 students per classroom, and this difference speaks much about the fragmented, project-driven nature of a child's education experience in American schools.

Class Size and PTR Are Birds of A Different Feather

Doesn't everybody know the difference between class size and PTR? Maybe they don't, or they haven't really thought about it. Critics of small class size may not understand the difference between PTR and class size. Maybe they just substitute one term for the other as synonyms. Although the distinction between class size and PTR is extremely important as a base for education policy and in planning, conducting, and assessing education, this distinction is consistently blurred in discussions and criticisms of education. Class-size critics may not understand the difference between PTR and class size; they nay mistake the terms to advance personal agendas.

Class size and PTR are frequently misused or used imprecisely by education's critics and in the media. Two examples highlight the confusion that imprecise use can cause. In these examples, the authors write about education and probably should know the differences between PTR and class size. One author of these quotes was a former official in the Department of Education. Both writers often explain that other things are more likely to improve student outcomes than is a change in class size. If by class size the authors mean PTR, they may be correct. If they really mean class size, the

weight of evidence supports smaller classes. In each quote, PTR and class size appear as synonyms in the same sentence.

> . . . teachers, after all, are rational beings. They respond to opportunities, incentives, and working condition. Since 87 percent of them are public employees, it follows that policy-makers' decisions have great impact. A policy decision to employ more teachers (such as by reducing pupil-teacher ratios, which have fallen from 27 to 1 to 17 to 1 over the past 40 years) is obviously different from a decision to hold class size constant but pay teachers more—or invest more in technology . . . recognizing that ever-smaller classes are a costly and ineffectual recipe for improved student performance . . . (C. Finn, 1997, pp. 48, 36. Emphasis added).

> Most discussions of reducing class size begin with an assertion that student performance will increase if only class sizes can be reduced, a proposition shown to be generally erroneous. They then move quickly to policies of large-scale reductions in pupil-teacher ratios where there is no direct linkage between specific class size decisions and student performance. The situation and the educational outcomes might change dramatically if everybody had stronger incentives to use budgets wisely and to improve student performance. (Hanushek, 1998, p. 36. Emphasis added).

Class size influences student outcome positively (e.g., Finn & Achilles, 1998 and 1990; Robinson, 1990; Wenglinsky, 1997) and PTR doesn't influence outcomes very much as shown in studies (e.g., Boozer & Rouse, 1995) and in evaluations of Title I, a PTR-driven and teacher-aide laden education improvement effort (e.g., Borman & D'Agostino, 1996; Wong & Meyer, 1998). Project STAR (Student Teacher Achievement Ratio) provided experimental evidence that teacher aides do not influence outcomes much (Boyd-Zaharias & Pate-Bain, 1998: Word et al., 1990).

The differences between class size and PTR also offer one choice for policy decisions that could make small classes far more widespread, less expensive, less hectic to implement, and perhaps far more effective and efficient than the larger classes that are now used. Thus, the terms must be used with precision.

PTR and Class Size are not the same:

The terms class size and PTR are frequently misused . . .

Why Are There Critics of Small Classes?

Some individuals and groups continue to argue that something "might" be more appropriate for improving education than to start new students in small classes when they begin their sojourn of 13 or more years through the public education system. Critics seldom explain what that something is, or the research base for it, or how to do it (for example, "better teachers").

Differing positions and points of view deserve to be made public in an open debate so that important research-driven and data-based changes can be made. Positive criticism and healthy, informed skepticism of constructive critics can improve the entire process. In the case of schooling for young children, however, recommended alternative policies and ideas should be built upon solid research evidence about education benefits for young children and upon the experiences of successful teachers and parents. Importantly, the ideas to improve public schooling should also strengthen the cornerstones of American democracy. The ideals of public education are built upon Jefferson's admonition that a nation that "wishes to be ignorant and free, wishes what never was and never will be," and upon social values of quality, equality, and equity.

Widespread use of small classes for early primary grades can change the landscape of public education dramatically. Pet projects, ideas of special-interest groups, and traditions will be challenged and may be changed. Change brings a concurrent shift in power relationships and in distribution of resources. No wonder that changes elicit strong feelings. Persons who believe that they may lose something in shifts of power and resources can be expected to take strong stands against the change. People who are uncertain about how the change will influence their known, comfortable, routine activities may be reluctant to change.

For example, small classes in early elementary grades should disrupt the current practice of using a myriad of special projects to address each perceived problem facing the schools. The project-driven mentality to "fix" schools is highlighted by the crazy quilt of categorical funding for education. This project-mentality approach to try to stem the rising torrent of challenges for educators presents a great metaphor for those readers old enough to remember tires with inner tubes. Conjure up the image of education as an inner-tube trying to inflate the wheels of progress. Unfortunately, the tires' old black-rubber inner tubes have become splotched all over, measles-like, with small red-rubber patches each disconnected one from the other, and each a prime candidate for a blow out. Education needs tubeless new tires. Even education's critics will profit from the better ride in the long run.

Public education touches lots of people. Education must not be an unfunded mandate and a public liability that occurs when policy makers legislate expensive changes without providing the funds to support those

changes. Public education becomes an unfunded liability when the public does not provide resources so the school buildings that students are required to attend will at least meet local building or fire codes. Educators face an unfunded mandate when higher standards are imposed without support to improve working conditions so that those in schools can achieve the standards that have been set. Besides many shoddy facilities, one other example of limiting conditions imposed upon students is a steady creep in class sizes in early grades.

Classes of about 15 to 18 students and one teacher (15:1 or so) will need an initial investment that will return solid economic and social benefits in later years. In setting policy requiring school attendance and in contemplating funding levels, adults may wish to recall poet Robert Service's line in "The Cremation of Sam McGee": "Now a promise made is a debt unpaid, and the trail has its own stern code." Do policies about schooling constitute "a promise made?" If the debt remains unpaid, do poor conditions in schooling build a trail that has a stern code? Does that code spell out violence, gangs, low scores, lack of participation in democratic processes?

Studies of class size, such as Project STAR, show that students in smaller rather than larger classes generally have better outcomes or achievement, broadly defined, in several areas and not just in test scores. This small-class effect is not a new finding. Glass and Smith (1978) found that as class size decreases, student achievement increases, and that the increases are greater in well designed and conducted studies than in less rigorous studies. This may say something about the care needed in implementing small classes.

People wish to understand what occurs in small, appropriately-sized classes to produce the demonstrated higher outcomes. This inquisitiveness is natural. Professionals wish to understand why or how smaller classes improve education outcomes and findings from well conducted studies will add to an expanding knowledge base for improving teacher preparation and staff development.

As policy makers and educators in the "front lines" lead the newly energized efforts to get reasonable-sized classes for small children in elementary schools, there are calls for understanding more about what teachers do in those small classes. Clear definitions provide common terms and guidelines about the discussion of class size and teacher practices.

1. Class size is the number of students regularly in a teacher's room and those for whom that teacher is responsible and accountable. Class size can only be determined by counting the number of students in a teacher's class or by studying the class roster. Class size can be set experimentally, as in Project STAR, but even then, researchers used a range, such as 13-17 for a small class.

2. Pupil-Teacher Ratio, or PTR is a number manufactured by dividing the number of students at a site (e.g., a building) by the number of professionals serving that site. (Sometimes this number includes adult assistants such as instructional aides).

3. For practical purposes, and considering current legislation and practice, a "small" class has about 15-18 students per teacher, and is designated in this book as 15:1, or 18:1.

According to Cahen and Filby (1979) " the search for an appropriate descriptive ratio has a long history in the research on class size. Any ratio is at best a crude indicator. . ." (p. 492). The accuracy of any computed PTR will greatly influence the results of studies that use PTR as one variable.

In STAR, small classes were randomly established in the 13-17 student range. The class size and PTR in a STAR classroom were the same only when the single classroom is considered. Even in STAR, when PTR is computed at the building level, the PTR for all classes—small (S), regular (R) and regular with aide (RA)—is exactly the same: The class-size distinction disappears and the PTR will hide generally large classes. The example in Table 1 shows the PTR-class size confusion. Shadytree Elementary School, grades K-5, has 511 students, with 252 in grades K-2 which are shown in detail for each teacher. Grades 3-6 with three classes per grade (as in grades 1 and 2) have 259 students and 9 teachers. Kindergarten has four STAR experimental classes with 84 students randomly assigned to 2 (S), 1 (R) and 1 (RA) classes.

Shadytree Elementary also houses or has the services of 9 other educators including administrator, counselor, media specialist, Title I, etc. These 9 other educators and 19 regular classroom teachers give Shadytree a PTR of 511 divided by 28 educator positions, or 18.3. Only two classes in Shadytree—the two STAR (S) classes in Kindergarten have fewer than 18.3 students. Other classes have 9-10 more students than the school's PTR of 18.3 with a range of 27-29 in non-STAR classes.

In most STAR schools, the (R) classes that served as the control group in the experiment were smaller than the classes in the rest of the grades in the school. This occurred because one guideline in STAR was that no student should have less of an education opportunity from participating in STAR than if STAR were not in that child's school. If STAR were not in Shadytree Elementary, and there were three kindergartens for the 84 students, the average class size in K would be 28. Thus by participating in STAR and even being in the (R) class, a student would be in a smaller class than if STAR were not at Shadytree.

TABLE 1 ABOUT HERE

Because the immediate outcomes of small classes for students in early primary grades are positive and pervasive, because benefits continue for several years, and the outcomes are more than the usual higher reading and math scores, and because outcomes of changed PTR are not generally positive, we need to learn more about why and how these outcomes occur in small classes. Equally important is to determine why outcomes are not much better in changed PTR conditions. One way to improve this knowledge is to increase our repertoire of teaching practices by careful observations of teachers and students in small classes. Observations of teaching for research purposes will help us know what successful teachers do in small classes.

PTR and The National Commission on Teaching and America's Future

According to Darling Hammond (1998), part of the three-pronged central message of the National Commission on Teaching and America's Future included these two elements:

- "What teachers **know** and **can do** is one of the most important influences on what students learn . . .
- School reform cannot succeed unless it focuses on creating the conditions in which **teachers can teach and teach well**." (p. 6)

The emphasis of this commentary was upon the need for more and better prepared teachers and upon restructuring schools so that teachers could do the professional work of teaching. According to substantial experimental evidence, the careful use of smaller rather than larger classes has provided many of the elements which the National Commission on Teaching and America's Future seeks in schools. The results flow as a direct result of the use of smaller classes, at least in the early grades.

Darling-Hammond (1998) listed conditions that influence teacher success. Of those listed, at least 13 elements reported in the late 1990s are similar to important ones that had been isolated in the 1960s and reported by Lindbloom's (1970) analysis of small-class activities. Lindbloom found that in smaller rather than in larger classes the following 10 things took place more often (paraphrased):

1. Frequent individualized instruction was geared to the needs and interests of students.
2. In addition to the textbooks, teachers used a wider variety of educational materials to enrich teaching.
3. Increased interaction occurred among pupils and between teachers and pupils.
4. Teachers made greater use of innovative or new materials and methods.

5. There was more student self-control and discipline with less teacher domination.
6. There was more small-group work than in larger classes.
7. Improved human relations occurred among students and with the teacher.
8. A greater number of instructional activities were used frequently.
9. Fewer discipline problems were observed.
10. There was improved morale among teachers.

(Lindbloom, 1970, Paraphrase.)

Teachers in smaller rather than larger classes personalize their instruction more, use a wider variety of methods and materials, have more student participation and fewer discipline problems.

More than 25 years later, Darling-Hammond (1996) reported the following elements that contribute to teacher success (pp. 6-11):

- Work in environments that allow them to know students well
- Induction of beginning teachers (mentor)
- Communities in which students are well known
- Structures that allow teachers to know students and their families
- Teachers do not have enough sustained time with their students each day and over the years . . .
- . . . personalized teacher-student relationships . . .
- . . . greater knowledge of students' learning styles . . .
- . . . performance-based assessments . . .
- . . . accelerated and in-depth learning approaches
- . . . stronger connections between the classroom and students' homes.
- . . . opportunity to adapt their instruction to the needs of their students.
- . . . positive changes in students' educational performance as well as their own working conditions

Conditions that foster good teaching also foster learning.
Small classes are the foundation for these conditions.

Political Correctness and Child Advocacy?

Teachers and parents know that the items on both lists describing the conditions and elements of good teaching are important for good teaching and for student learning. The lists were compiled nearly 30 years apart. They hardly represent skills usually learned in staff development. They represent what most would simply call "good teaching" and what teachers learn in their teacher-preparation programs before they enter teaching. The parallels between the two sets—one set developed from class-size studies long ago and the other identified by a recent National Commission—raise interesting questions that deserve further attention in a serious non-political or special-interest-driven research agenda.

How much of the operational agenda of the National Commission on Teaching and America's Future could be achieved primarily by reducing class size? How do we make small class size happen? If many of the conditions of good teaching can be achieved solely by use of small classes, education leaders could re-deploy the funds normally used for paying staff-development consultants to hiring qualified teachers, thus passing the benefits directly to the student and avoiding the middleman. Some staff developers can become classroom teachers, thus reducing class size and meeting a condition that the National Commission would like to see ". . . reducing the numbers of nonteaching staff and increasing the numbers of classroom teachers . . ." p. 11). Small classes for young students aren't immediately "politically correct" but they are great for kids. (Sigh.)

"Through the Looking Glass" of PTR and Class Size

Another Commission concern was that in the United States there should be increased attention to having more teachers in classrooms and being responsible for student learning, rather than immersed in a myriad of education-support roles. Allocation of teaching roles gets at the distinctions, described earlier, between class size and PTR.

> Classroom teachers comprise 60 to 80 % of education employees in European and Asian countries studied by the Organization for Economic Cooperation and Development, but only 43% in the U. S., where the number of administrative and nonteaching staff has more than doubled over the last 30 years. (Darling-Hammond, 1998, p. 10)

The issue of deployment of educators raised in this quotation and also by the class-size and PTR distinctions addressed in Miles and Darling-Hammond (1998), by Achilles, et al. (1997-1998) and Achilles et al., (1998), and in other places shows how clarity in explaining differences between PTR and class size

is important in all class-size discussions. Lack of clarity in using these concepts helps explain why there are so many erroneous conclusions about the positive effects of class size, and the existence of ineffective school reforms and reform policies that eschew class size when leaders substitute PTR effects for class-size outcomes.

Discussions of "class size" have been confounded by lack of class-size data and by use of PTR data to try to explain class -size effects.

In Conclusion

The project-driven nature of American education's splotchily patched inner tube helps explains the PTR and class-size conundrum, too. Our prototype pupil, Pat, may leave the regular classroom for special help in the basics of education, such as reading. Who now is responsible and accountable for Pat's reading progress? A "special" teacher and the regular teacher both teach Pat reading; the PTR changes, but not the class size in Pat's regular classroom, in Pat's regular learning community.

"... pupil-teacher ratios are not the same as class sizes."
Hanushek (1998)

Teachers in small classes are responsible and accountable for the learning outcomes of the students in their classes. Because of the small classes, the classroom teacher can address many of a student's learning needs. When students in small classes are not pulled out of class often for remediation or special projects, the teacher and students form a family-like learning environment where the teacher can employ professional knowledge of teaching. Without the PTR problem, the teaching day is not shattered frequently by students coming and going and adding commotion to the normal business of 15-18 people learning together.

Table 1 Example of Class-Size and Pupil-Teacher Ratio (PTR) Difference.

Presume Shadytree Elementary is participating in STAR. Shadytree has 252 students in grades K-2, and a total of 511 students, K-5.

Grade and Classes	Students (n)
Kindergarten N=84 (STAR)	
Small	17
Small	16
Regular	25
Regular-Aide	26
Grade 1 N=85	
A	28
B	29
C	28
Grade 2 N=83	27
A	28
B	28
C	
Totals (K-2)	
Students	252
Teachers	10
Totals (4 and 6)	
Students	259
Teachers	9

Computation •	
Total Students	N=511
Other Educators	
Title	N
Principal	1
Counselor	1
Media Specialist	1
Special Education	2
Title I	2
Art	.5
Music	.5
Physical Education	.5
Gifted	.5
Total "Other"	9
Total Regular	19
Total Educators	28
PTR = 511÷28 or 18.3	

• This excludes teacher aides (n=4), secretary (n=1) and nurse (n=.5) who could add the equivalent of 3 more professional positions, providing a PTR of 511 ÷ 31 or 16.5.

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